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NKGONO JANE SAYS...

IN THIS ISSUE...

I have been thinking recently about what makes a good person and what makes a good citizen of South Africa?

Now and again I ask myself – what is the purpose of my life? What gives my life meaning? As a person, I believe that I am on earth to make a positive contribution in the lives of others. I need to be honest, reliable, considerate, caring and hard working. I need to work to generate an income so that I can feed and clothe my family; educate my children and prepare them for the world that they are going to live in (as well as I can because I do not know the world that they will live in); prepare for my retirement; and above all, make my little contribution to our society and our country.

As farmers, we don't work for anyone else – we are able to use land and natural resources to earn a living. However, the land does not do the work – we have to do the work on the land to produce the crops that we can sell. However, we choose to generate an income, we have to generate that income so that we can survive.

What would make me worthy to call myself a good South African citizen? A country has laws which we have to respect. The purpose of laws is to ensure that our society functions properly. I need to pay tax so that I contribute to the country. In South Africa now there are more than 17 million people who are getting grants from the government. Where does this money come from? It comes from the government and that comes from the taxes that people pay. Farmers even pay taxes that we are not aware of – import tax on many of our inputs, tax on the fuel we use, and VAT on our inputs. If we do not pay tax, the government would have no money and our country would stop functioning.

Does being a good person, or a good farmer, or a good citizen have anything to do with my colour? No, indeed it does not. We are all South Africans and we need to work together to make a better future for us all. I love the words of the Dalai Lama: **If we were really to see one another as brothers and sisters, there would be no basis for division, cheating and exploitation among us. Therefore, it is important to promote the idea of the oneness of humanity, that in being human we are all the same.**

Understanding the MAIZE MARKET

Market prices in all produce sectors are always changing due to several different factors. As producers it is our responsibility to keep abreast with our products prices and continually keep track of trends.

There are numerous sources of information available that we can follow to do this, but we need to be careful as some are more reliable then others. Be discerning. In this article we will look at different factors that affect market prices and how to know whether we are receiving the correct price for our products.

The maize market price is one of the most volatile of all the grain sectors and because this is one of South Africa's primary food products it influences a big proportion of our countries farmers.

Why do we plant maize?

Profit, climate and food. These are the three main factors that determine the viability of producing a crop of maize. We must be producing a crop that makes economical sense. If we don't then we are running a business which is not sustainable. We also need to be producing crops which are suitable to our specific climatic conditions. Finally, we as farmers have the immense responsibility of providing food for our nation's population. We need to perfect the task of balancing these three factors in a way which still makes business sense and can translate into a profitable operation.

Factors influencing maize markets in South Africa

The main factor above all others which determines the price of maize in each season is **supply and demand**. Roughly 75% of maize produced in a season is consumed by our own local market. This can be in the form of maize based food products for humans as well as animal feed. Simply put; when we have a good year and our maize crops yield well, then the price of maize will decline as there is an abundant supply. In poorer drought years when there are lower yields the price will increase with demand.

> *"Maize has a long value chain to follow from the farm to the consumer and each step requires fuel.*

International market influences also play a role in the prices we receive for our maize. In years when we have an under supply of maize in the country we need make up the shortfall by importing maize from other countries. At times this can have a ripple effect on our market because as we build up stores of cheap imported maize it can result in the local price of maize being stagnated.

Our local maize price is also affected by export demand for our crop. In years when we have an oversupply of maize there may be other countries that have experienced a shortfall resulting in them becoming a potential importer of our maize. This can hold our prices stable. There are however several international trade regulations which factor into this such as export and import tariffs and health standards.

This is a complex topic which we won't discuss in this article.

The price of **fuel and transportation** plays a big role in our maize price as it does in most other commodities. Maize is produced all over the country and needs to be moved to storage facilities and into the market. So, when the price of fuel goes up the price of the maize we produce will go down as the purchaser factors this into his costs. Maize has a long value chain to follow from the farm to the consumer and each step requires fuel.

Is the price we receive market related?

We now understand a few basic principles which determine the maize price, but how do we know that the price we receive is market related?

This is where you as farmer needs to stay in touch with what is happening in the market. Keep informed by reading and listening to those who are knowledgeable on the topic. This is very important as you may want to strategise and plan when and how you market your crop to try and receive the best possible price. You may even consider storing your maize for a period of time until the price increases again.

There are reliable sources which publish daily maize prices such as Grain SA and Safex. You can request to have a daily text message sent to your phone which will give you the current prices. Your local co-operatives such as Afgri, Suidwes, NWK, Senwes and others will also be a reliable source where you can find out what the price is, and the possible future trends may be.

> *"The most important thing is to do your research before accepting any offer on your product as there unfortunately are always those who will try and take advantage of the unknowing.*

The most important thing is to do your **research** before accepting any offer on your product as there unfortunately are always those who will try and take advantage of the unknowing. You should however be aware that there are always certain deductions which are standard in the industry. You may have weight deducted for maize which is dirty with lots of residue in it. You may also be penalised for poor quality maize. Most market places work on a standardised grading system. You may also at times be charged a small handling fee when you deliver your crop to the market place. These are common and should not deter you from selling. Above all else keep informed and keep in touch with your industry.

Article submitted by Gavin Mathews, Bachelor's in environmental management. For more information, send an email to gavmat@gmail.com.

Impact of NEMATODE PESTS in crop production

Plant-parasitic nematodes (PPN) are microscopic roundworms that attack plant roots and other below-ground parts, but also stems and leaves. They are among the most widespread pests with over 4 000 species of plant-parasitic nematodes reported worldwide.

In South Africa, about 455 species have been reported. However, *Meloidogyne* spp. (root-knot nematodes) is the economically most important pest parasitising most crops followed by *Pratylenchus* spp. (lesion nematodes). Although information on their economic impact remains less than comprehensive, collectively they pose an important constraint on the delivery of local food security particularly for crops produced in subsistence farming areas.

Weeds on the other hand, do not only compete with crops for space, light and nutrients (**Photo 1**), but may act as hosts of other pests, thus, posing economic yield losses on crop production.

> *"Crop and quality or yield losses due to plant-parasitic nematode parasitism are usually more serious in subsistence farming communities than in first world countries.*

Crop and quality or yield losses due to plant-parasitic nematode parasitism are usually more serious in subsistence farming communities than in first world countries. This is particularly due to knowledge gaps as well as the limited availability of infrastructure and finances existing in the subsistence agricultural sector.

Damage caused by plant-parasitic nematodes often goes unnoticed or are attributed to other growth limiting factors, due to lack or absence of above-ground symptoms and ignorance by producers. The nematode problem is furthermore aggravated in the developing agricultural sector due to limited and marginal land available to grow food crops and the traditional use of cultivars that are susceptible to PPN in multiple cropping and intercropping systems (**Photo 2a - b**).

Control measures

It is crucial to identify the effective and compatible integrated pest management strategies that will address both weed and nematode management collectively, in order to prevent population build-ups of target nematode pests. Weeds generally reduce the efficacy of crop rotation aimed at nematode management.

In addition, some weeds that serve as a supplementary food source, may not be intentionally removed by producers, but rather be semi-cultivated along with a given staple food crop. This inevitably leads to a build-up of PPN populations and eventually the main crop suffers damage while producers are unaware of the situation.

Control strategies may include one or a combination of the following:

2a

2b

An example of multiple or intercropping systems practiced by subsistence farmers.

1

Weeds occurring among maize in the field, which may lead to population build-up of plant-parasitic nematodes.

ABOVE-GROUND SYMPTOMS ASSOCIATED WITH PLANT-PARASITIC NEMATODES ON CROPS

3

Patches and stunted growth on a maize field caused by plant-parasitic nematodes.

4

Discolouration of leaves and stunted growth of vegetables caused by plant-parasitic nematodes.

BELOW GROUND SYMPTOMS ASSOCIATED WITH PLANT-PARASITIC NEMATODES ON CROPS

5

Galls on carrot, potato and on roots of **Hibiscus** *spp. due to root-knot nematodes.*

- Timely weeding of food plots is essential to limit population PPN build-up, since weeds may serve as hosts and support the development and reproduction of such pests.
- Addition of organic matter:
  - Helps retain soil moisture and adds to the availability of plant nutrients.
  - Increased water and nutrient uptake by plants help to withstand nematode attack.
  - Manures, peats or compost amendments will also increase the level of microbes in the soil and thus favour the build-up of other beneficial micro-organisms that feed on all soil microbes, including non-parasitic nematodes. However, it is essential to ensure that compost used should not include partially decomposed roots/tubers that are infected with PPN or other soil-borne pathogens. Previous research showed that decayed kraal manure treatments reduced root-knot nematode numbers between 41% and 71% in tomato trials and between 49% and 99% in maize trials planted in resource-poor areas.
- Soil solarisation:
  - Effective for small plots and entails covering the soil with transparent plastic during the summer season when high day temperatures are experienced. This strategy was also successfully applied in ARC trials and reduced general root-knot nematodes substantially.
- Crop rotation:
  - Plants that are related usually are susceptible to same pests and diseases and should not be planted close to each other or follow each other in a rotation cycle. Root and tuber crops in particular should not be planted in the same area of the garden in succeeding years because they are highly susceptible to PPN and other pests and diseases.

> *"It is crucial to identify the effective and compatible integrated pest management strategies that will address both weed and nematode management collectively, in order to prevent population build-ups of target nematode pests.*

- Host plant resistance is another option for the prevention of general root-knot nematodes population build-ups in cropping systems. This method is a good management choice because it involves minimal effort and expense. However, resistant crop varieties are not available for all grain and vegetable crops.
- Use of green manure and or cover crops such as Vetiver grass and the Brassica cultivar Nemat reduced general root-knot nematode populations in both greenhouse and field trials. Vetiver grass can also add value for a producer where livestock forms an integral part of the farming system.
- Physical destruction of roots/other plant parts: Destroy roots/other plant parts as soon as the plants are no longer growing in the garden. Plant-parasitic nematodes continue to feed and reproduce on root fragments/other plant parts in the soil and build up to damaging levels for susceptible, follow-up crops.

Article submitted by Nancy Ntidi, ARC-Grain Crops, Potchefstroom, Akhona Mbatyoti, ARC-Tropical and Subtropical Crops, Mbombela and Driekie Fourie, Unit for Environmental Sciences and Management, North-West University, Potchefstroom. For more information, send an email to ntidin@arc.agric.za.

CANOLA
– what to look out for during October

In October we start to prepare to harvest the rewards of our labours of the past months. All topdressings, fungicide sprays and herbicide applications are a thing of the past.

Canola that is in the early pod filling could still be prone to late insect infestations and regular weekly scouting should still be conducted. This is more likely in canola that has branched excessively due to a less dense stand and the pods on the outer branches are slower to develop.

Insects that can cause economic damage at this stage include aphids, diamond back moth and bollworms. Only infestations that exceed the recommended spray threshold should be sprayed.

Aphids

Aphids generally become a problem during hot, dry weather conditions. Heavy clusters of aphids on the top of stems and pods can impair the filling of the pods. Only consider a spray application if a high number of plants are infested. Mature canola can tolerate a higher infestation of aphids than in the earlier growth stages.

Cold weather slows the increase in aphid populations and rain can even reduce the population. Beneficial insects like wasps, hover flies and ladybirds are predators or parasites of aphids and can reduce populations. It is therefore important to monitor the situation regularly to determine whether a spray application would be economically justifiable.

Diamond back moth (DBM)

Be on the lookout for small white moths that fly between plants when disturbed. Inspect plants for signs of light green larva that are often suspended from a silk thread in the plants when disturbed. Small larva eat holes in the leaves which is also a sign of possible infestation. When they grow larger they will eat holes in pods which can also result in secondary damage by diseases.

The life cycle of DBM from eggs to adult moths in warm temperatures (28°C) can be as short as 14 days, so populations can increase very rapidly. Spraying for DBM should only be considered when more than 20 larva of 3 mm to 4 mm in length per ten plants are counted in the middle to late flowering stage. This figure increases to 50 larva per ten plants at the pod filling stage.

Bollworms

Canola fields should be monitored from the onset of flowering for the presence of bollworms.

Heavy clusters of aphids on the top of stems and pods can impair the filling of the pods.

Canola fields should be monitored from the onset of flowering for the presence of bollworms.

Night flying moths lay white eggs singly on the upper surface of leaves. The bollworm moth has reddish brown front wings and creamy white back wings. An adult moth can lay as many as 1 000 eggs during her five to eight-day lifespan. The eggs hatch after a week, producing small larva that feed on foliage. These larva moult six times within 14 to 18 days and an adult larva can reach 3 cm in length. Because of the large number of eggs laid, populations can increase rapidly, and heavy bollworm infestations can cause serious damage to the crop.

Conditions favouring outbreaks of bollworms include drought conditions, heavy aphid infestations as the moths feed on the honeydew produced by aphids or the absence of alternate feed sources for the larva. Bollworms in the early larval stages (less than 1 cm) are more easily controlled than adult larva. Spraying should only commence when five to ten larva per m^2 are counted.

Harvesting canola

Many farmers tend their canola for the whole growing season, only to lose net profit at the end of the season. Many researchers believe that unnecessary losses, which cost the farmer nothing if corrected, occur at swathing and in the harvesting process. Estimates of yield losses due to incorrect timing or loss of grain in combining can easily vary from a few kilograms to 500 kg\ha. At current prices, this represents R500 net profit per every 100 kg loss.

Swathing

The availability of equipment is usually a deciding factor in whether to swath or to harvest directly. In areas that experience strong wind when canola starts ripening swathing should be preferred as extensive losses can occur to standing canola.

Swathing has other advantages over direct harvesting, although many farmers in both Australia and Canada have returned to direct harvesting. When canola ripens unevenly swathing assists as seeds tend to ripen more uniformly when swathed. It can also assist a farmer to combine the harvest 8 to 10 days earlier.

The ideal time for swathing is when seed discolouration is between 40% and 70% with a moisture content of 30% to 40%. A farmer should rather err on the later side, especially in hotter, dryer areas because higher temperatures cause windrows to dry faster. Canola swathed too early can cause green kernels and smaller seeds with lower oil content.

To determine seed discolouration, samples of 100 pods which are representative of the entire field should be collected. As seed ripening starts at the bottom of the plant, pods should be picked from the bottom, middle and top of the plant on the main stem. Open the pods and observe the degree of seed discolouration. Count the number of seeds that have discoloured to yellow, brown or black. In the Canola Production Manual clear illustrations for determining seed colour change are pictured.

The cutting height should be above the branching of the plants, so that the standing stubble forms a fork in which the windrow can lie.

The ideal time for swathing is when seed discolouration is between 40% and 70% with a moisture content of 30% to 40%.

The first samples should be taken 15 days before the end of flowering in order to determine the ideal time to swath. The end of flowering is defined when 10% of all plants still carry flowers. Samples should be taken regularly, because when seeds are firm when rolled between the fingers, it could discolour within 24 hours. Discolouration speeds up when it is hot and dry and is slower when cool and moist conditions prevail. In the field, seed has been found to discolour as follows per day:

20°C to 24°C: 3% to 4%;
24°C to 2°C: 4% to 6%; and
27°C to 30°C: 7% to 8%.

If canola is swathed four or five days too early, yield losses of up to 10% may be suffered. The ideal window for swathing lasts only three to four days. This period occurs approximately 21 to 25 days after flowering, depending on the climate. Yield losses if swathing takes place too late can be reduced by swathing at night or when humidity is at its highest.

The cutting height should be above the branching of the plants, so that the standing stubble forms a fork in which the windrow can lie. This ensures better wind movement under the windrow and the canola dries faster. Depending on climatic conditions after windrowing such as temperature, wind and humidity, canola can be combined approximately 7 to 14 days after swathing.

Direct harvesting

Seasonal conditions are the largest factor influencing when canola can be direct harvested. Generally, canola is ready for direct harvesting about 16 to 20 days after the optimum windrowing time, but a dry season will speed up the time before harvest. The key to correct timing for direct harvesting is seed moisture percentage. The ideal level is 7,5% to 8%, which means pods are less likely to shatter and there will be a smoother flow of stalks into the header.

> *"Proper wetting of the entire plant is important as the contact chemical does not translocate in the plant.*

Reaping at 7,5% moisture means canola can be harvested without dew as plants will still be a bit green. If farmers wait until canola stalks start to turn white in colour, as they would for harvesting windrowed canola, seed losses will be higher. If seed moisture drops below 8%, then keep harvesting and do not stop. Pod maturity may develop quickly in hot weather, so timing is critical. Harvest speed is more critical when direct harvesting canola compared to other crops. Excessive speed, especially when the crop is dry, can cause significant shattering at the knife and divider. Harvest speed may need to be gradually reduced as the day approaches midday. Harvest when the relative humidity is above 70% and stop harvest when it falls lower. Canola may be delivered with a moisture content of up to 14%, provided that drying facilities are available.

When canola has ripened unevenly, late weeds have germinated and can cause problems at harvest or when the crop has lodged, chemical ripening can be considered. Only use a product that is registered for chemical ripening as other product's residues could disqualify the delivery of the crop. Proper wetting of the entire plant is important as the contact chemical does not translocate in the plant.

The stage for applying a chemical ripener is very important as too early a spray will result in pods not developing further. For chemical ripening, seeds must be at between 70% and 80% discolouration which is later than for the swathing stage. The canola will be ready for harvesting between four to seven days after spraying, depending on the size and density of the crop. Be careful to only spray an area that can be harvested within one or two days in order to avoid losses due to shattering.

Plan for next season

Once a field has been harvested, a number of actions can assist farmers to plan for the future. Look at cut stalks to determine the level of infection of black leg and sclerotinia. Should indications be that a high level of sclerotinia was present, try to not plant canola in fields in close proximity to the infected field the following season.

Also rate the efficacy of your weed control programme. Note which weeds are present, determine whether the chemicals used were the right choice for your dominant weed spectrum and plan with your advisor should changes have to be made for the future.

Finally, consider which fields are to be planted to canola next year and consider the harvest process of the current crop. Canola does not germinate well under a heavy stubble load, so consideration should be given to either reducing the amount of stubble left, e.g. by baling the straw, or cutting and spreading the straw evenly to avoid clumping of residues.

Article submitted by Chris Cumming, consultant for the PRF (Protein Research Foundation). For more information, send an email to cummingza1946@gmail.com.

CONSIDER THESE FACTORS WHEN PLANTING SOYBEANS

Your summer crop programme planning might include more than one crop as well as the production of soybeans either within a dryland or irrigated crop rotation cycle.

Some of the considerations for the ideal crop husbandry required would differ depending on whether dryland or irrigated production is to be done.

The commodity derivatives market or Safex price for soybeans over March and May 2019 is R4 807/ton. The gross margin analysis comparing various crop options would have indicated the expected net returns from the various crop options produced on your farm and crop yields experienced with the soils and climatic zones of the area in which you farm.

The price levels per ton indicate that a minimum target of 2 tons or more yields for dryland production of soybeans would be the ideal. Do your own detailed cost analysis to be sure.

Management and production factors to focus on during October and November

Seed and planting

Some dryland production areas received over 50 mm in July and together with the late summer and autumn rains the soil profile should be almost a field capacity. This was evident especially on lands under conservation tillage or no-till this year.

Should this be the case on your farm, planting soybeans early is a choice. This might be the year for really good yields. One could perhaps plant a third of your soybean crop early in September or October and the balance over November and early December.

Soybean cultivar choice will be the most important decision you will make. Purchase soybean cultivars from reputed suppliers and ask their advice as to which variety is best for long or medium season production. There are so many choices available now that are tailored to your soil potential, rainfall patterns and heat units experienced during the growing season in your area.

> *"Plan to have all your soybean direct crop inputs on hand in time, on the farm, after considering all the best recommendations from your team of advisors.*

The exact choice of an early, medium or late cultivar planted at the correct time can really be the make or break factor that ensures that you will attain the highest yield possible under your local conditions. Make sure that have bought enough seed for a replant should this be required. A final plant population of between 240,000 and 280,000 is a good rule of thumb to follow as an ideal for dryland production. Apply this target to both 0,76 metre 0,91 metre spaced rows when calibrating your planter.

Fertilisation planning

When planting, whether using conventional or conservation tillage methods make sure your planter soil engagement mechanism is correctly set to ensure good soil to seed contact and fertilisation levels have been correctly calibrated to the recommendations.

Some farmers use a small amount of nitrogen at planting, others don't. Consult your seed supplier and agronomist to know the accepted practice and experience regarding fertilisation for top yields and experience on your farm or area. Fertilisation based on the nutrients to be extracted is the minimum that must be used. A shortage of available phosphorus and potassium will have a major impact on targeted yields. Have your soil analysis done on time so that you know why you are using the recommended application of nutrients tailored to your soils fertility status. Buy the right fertiliser according to recommendations in time.

Rhizobium and nodulation

Make sure that your rhizobia inoculation programme is of the best and use inoculants from the best sources. Don't take any chances in this regard and inoculate your seed exactly according to instructions. Some products can be mixed several days before planting while others must be mixed correctly hours before you plant for best results.

Many inoculants include root growth enhancing stimulants in the basic inoculant product. These can really work depending on the fertility status and soil tilth and structure found in your lands. Do not expose the mixed seed directly into sunlight when filling your planter with the treated seed.

It is important to monitor the development of the nitrogen fixing rhizobium bacteria on the soybean roots. A good inoculation to create strong and many root nodules is the key to achieving a high yield.

Weed control programme

If you are using glyphosate tolerant cultivars make sure that your spray rigs are maintained for timely and correct applications so that any problem weeds are controlled at the right time within your planting planning. Please seek advice as to the timing and concentration of the glyphosate product to be used. This advice holds for mechanical tillage methods supported by non-glyphosate weed control methods.

Conclusion

Plan to have all your soybean direct crop inputs on hand in time, on the farm, after considering all the best recommendations from your team of advisors. There are so many technical advancements in cultivar choice and production methods each year one must develop a network of advisors that are at the forefront of every aspect of soybean production.

Article submitted by a retired farmer.

SOYBEANS: What is on the horizon this coming season?

Global soybean production for 2018/2019 is projected at 354,5 million tons. Brazil's production is expected to remain flat at 117 million tons while Argentina, has recovered from the drought and it is expected that their production will increase by 17 million to 56 million tons.

The Department of Trade and Industry (DTI) came up with an import replacement strategy for soybeans a couple of years ago, this stimulated production as well as increased capacity in soybean crushing plants in the country.

Over the past decade, soybeans have been the fastest growing field crop in South Africa. With soybean planting season approaching, it seems like the trend will continue to grow. The previous season was a good one, with 573 950 ha planted and a final crop of 1,316 million tons, this was mainly attributed to good weather conditions.

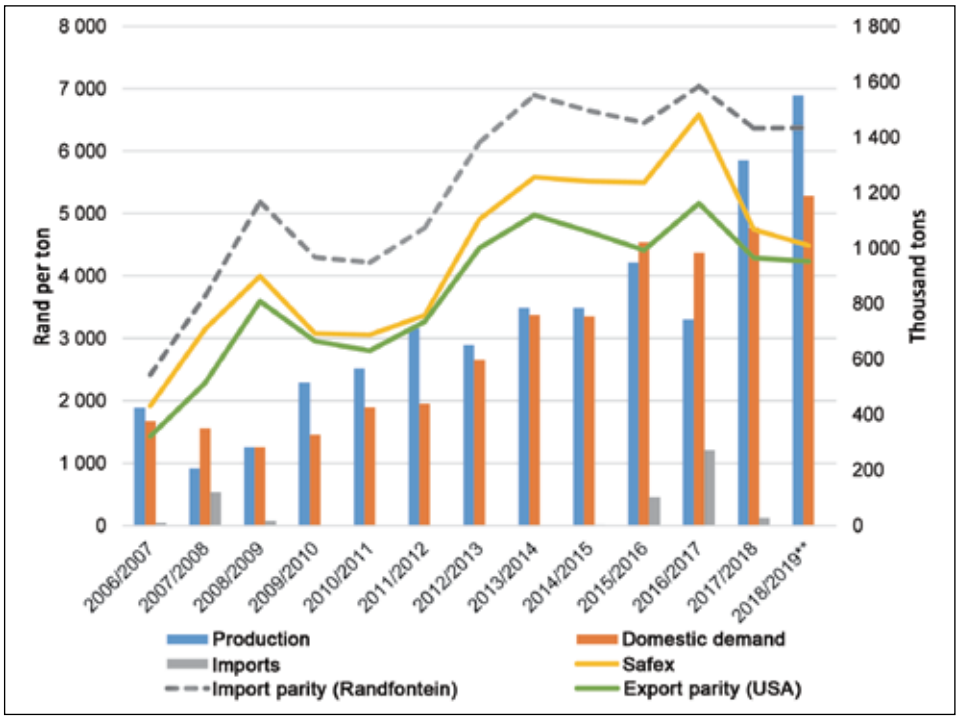
For the 2018/2019 marketing year the Crop Estimates Committee (CEC) has estimated the area planted under soybeans to be 787 200 ha, with a production of 1,551 million tons and an expected yield of around 1,97 t/ha. Mpumalanga remains a major soybean producer with 554 300 tons produced in 2017/2018 and production is expected to increase by 127 700 tons to 682 000 tons in 2018/2019. Followed by Free State with production of 504 000 tons in 2017/2018 and this is expected to increase to 552 000 tons this coming season.

In 2017, soybean prices fluctuated around R4 600/ton, which was a 29% decline year on year, due to lower international prices and a strengthening rand. For the upcoming season Safex prices are projected to trade between import and export parity (**Graph 1**), with derived price for cake and oil determining a relative benchmark for the local price (**Table 1**).

Table 1: Value of soybeans derived from soy oilcake (47% protein) landed in Durban as on 2018-08-21.

Shipping R6 297	Soybean oil R10 900	Soybean hulls R1 600	Exchange rate R14,43
Landed DURBAN 47% protein oilcake			R6 297
			R6 297
Income from oilcake 74%			R4 660
Income from soybean hulls 2%			R32
Income from soybean oil 17%			R1 853
Income total			**R6 545**
Costs of pressing and minimum margins			R400
Transport to soybean plant			R200
Price to soybean producer (on farm)			**R5 945**

Graph 1: Soybean production, consumption, trade and prices: 2006/2007 - 2018/2019.



Source: Grain SA (2018)

Breakdown of the price information

- **Landed Durban 47% protein soybean oilcake**: Price at which soybean oilcake with a protein content of 47% can be imported (free on truck, Durban).
- **Hulls**: Price that soybean hulls are selling ex soycrushing plant reef.
- **Income**: Income from various components after solvent extracted crushing of soybeans in a commercial crusing plant.
- **Crushing costs**: The minimum income required to cover crushing costs.
- **Soybean transport**: The average cost of transport of soybeans to the crushing plant.
- **Price to producer on farm**: The intrinsic value of soybeans on the farm considering all the cost and income component to crush soybeans (solvent extracted) and realise a minimum margin.

For South Africa's soybean market to continue growing and eventually become self-sufficient, we need to utilise maximum crushing capacity of 2,5 million tons for both soybeans and sunflower. This will then require a significant reduction of imports than what we currently receive; soybean importers within the country need to start buying local produce and measures need to be in place to stop oilcake that comes into the country at a price below our production cost.

Article submitted by Ikageng Maluleke, Junior Economist, Grain SA. For more information, send an email to Ikageng@grainsa.co.za.

Let's talk about crop rotation

If you want different results you have to try different approaches

Crop rotation was a normal practice for farmers of the ancient world. During the Roman Empire farmers followed a system known as 'food, feed and fallow'.

They would divide their fields into three sections then plant a food grain e.g. wheat or corn, a livestock feed, like barley or oats and then the third portion would be completely rested and given a chance to recover nutrients and organic matter.

Crop rotation fell out of favour with farmers by the 1950s when 'modern' technology and chemicals made it possible for farmers to turn to mono-cropping and produce consistently high yielding crops using newly available fertilisers, pesticides and herbicides.

But the wheel has turned...

There are many maize growers who have successfully grown maize in a field continuously, using heavy fertilisation programs and controlling insects and weeds with high levels of pesticides. South African farmers found that monoculture produced high yields and good profits.

However, after an extended period of monoculture, farmers saw that growing the same crop in the same field year in and year out was leading to significant increases in the presence of pests and disease in their fields. Soil erosion was another problem they were encountering more than before. Profitability of crop production declined significantly in the 1980s and farmers faced increased risks in monoculture. They had to try something different – so they began implementing systems of crop rotation.

The negatives about monoculture cropping

- Soil erosion is usually accelerated by cultivation and is often more severe under monoculture.
- Crop yield can decline with monoculture.
- Weeds tend to increase and become a problem.
- Soil fertility deteriorates, and levels of organic matter are low.
- Soil structure and water infiltration rates are lower in monoculture systems.
- Monoculture leads to increased pests, disease incidence and yield loss.

The principles of crop rotation

Crop rotation is basically a system of growing different kinds of crops in recurrent succession on the same land with the purpose of improving sustainable production potential. It is a system implemented because it is either beneficial for the soil or for the economic returns – or both.

A good rotation will provide for improvement in soil fertility and productivity and will usually include a legume crop to promote fixing nitrogen, a grass or legume which will improve the humus and a crop which will promote weed control. The choice of a rotation depends on crops adapted to the regions soil, climate and also the economic climate. The diversification that comes in a crop rotation programme holds many benefits including economic use of water available.

Example of a healthy crop rotation system. Year 1 = Sunflower → Year 2 = Legume → Year 3 = Maize → Year 4 = Sunflower.

The benefits of crop rotation

Crop rotation has many agronomic, economic and environmental benefits compared to monoculture cropping. A well-planned crop rotation improves soil health considerably since there is increased organic matter, improved soil structure and a reduction in soil degradation. It can also result in higher yields and greater farm profitability in the long-term.

- Increased level of soil organic matter enhances water and nutrient retention.
- Improved soil status decreases dependence on synthetic fertilisers = lower input costs.
- Better soil structure improves drainage and reduces risks of water-logging during floods.
- Improved soil structure means less run off and less top soils lost.
- In many regions of South Africa wind erosion of top soils is a serious threat, improved soil structure and more organic matter reduces losses.
- Improved soil structure boosts the supply of soil water during droughts.
- Crop rotation is used to control weeds and diseases and problem weeds have been found to cause less damage in crop rotation than monoculture systems.
- Crop rotation, as against monoculture, limits infestations of insect and other pests and significantly reduces pesticide use = lowered environmental impact + lower input costs + increased profit margins.
- Leguminous crops – like soybean, beans, cow peas, ground nuts – in the rotation, fix nitrogen and bind it in the soil thereby increasing fertility and reducing the need for synthetic fertilisers.
- It is also not insignificant that crop rotation is a way of mitigating climate change. Reducing

IS YOUR BUSINESS GROWING?

In our previous article we made the statement that it is very important for our modern-day farmer, big or small, to be financially literate. In that article we focussed on the income statement or also known as the statement of financial result, the statement used to determine whether you are making a profit.

The income statement measures your financial result over a period, something like a race. In a business the race normally takes a year which is known as the financial year.

This article will focus on a balance sheet, also lately known as the statement of financial position and it measures the financial position of your business on a specific day. The financial position expresses the amount of assets in relation to the amount of liabilities or debt. Debt then indicating the amount of money you owe other people or financial institutions. But, the balance sheet is also used to determine the financial growth or progress of your business from one year to another.

In normal practice you will have a balance sheet at the beginning of a financial year and one at the end of the year which you will then compare with each other.

In **Table 1** is a brief simplified outline of two Statements of Financial Position or Balance Sheets on a specific day at the beginning of a financial year and a day at the end of the year. Only a few examples of assets and liabilities are shown.

First let's first clarify a few terms.

- Assets are everything on the farm that belongs to you – such as tools, implements, machinery, vehicles, buildings, livestock.
- Liabilities is all the money you owe to financial institutions.
- The terms current, medium and long refers to actual years – when referring to assets it refers to the normal lifespan of assets. Current one to two years, medium normally five years and long-term ten years and longer.
- When referring to liabilities it means the time you have available in which to re-pay the loan. Current or also known as short term means you have one to two years to repay the loan, medium-term normally five years and long-term ten years and longer.
- The term owner's equity or capital employed is the value of the money out of your own pocket that you have invested in your farm and/or profits that you have re-invested in your farm.

> *"In normal practice you will have a balance sheet at the beginning of a financial year and one at the end of the year which you will then compare with each other.*

To be able to compile a balance sheet you need information. First, you need an asset register which is basically a list of everything that belongs to you and the money value of the items. Secondly, you must keep proper record of all liabilities.

Why is a balance sheet important? From the balance one can determine whether your business is growing. That is done by determining the difference between the owner's equity at the end of the financial year and at the beginning of the financial year.

In our example the end of the year was 28 February 2018 and the beginning 1 March 2017. The difference then being R117 5000 minus R1 090 000 (figures J) which is positive by R85 000. It is always the end amount minus the amount in the beginning. When the result is positive, as in our example, it shows that your business has progressed during

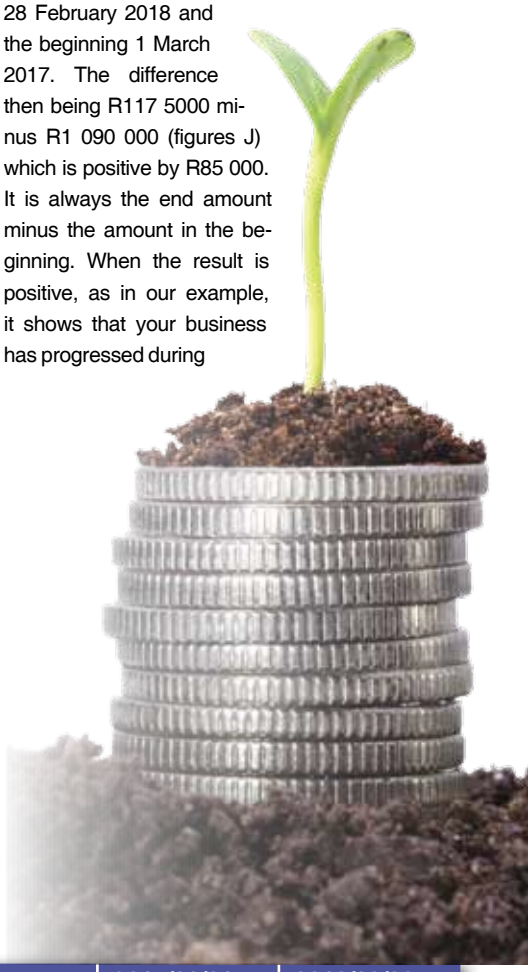


Table1: A simplified outline of two Statements of Financial Position on a specific day at the beginning of a financial year and a day at the end of the year.

	Assets	2017/03/01	2018/02/28		Liabilities	2017/03/01	2018/02/28
	Current assets	R	R		**Current liabilities**	R	R
	Bank	25 000	-		Bank	-	5 000
	Marketable livestock	100 000	125 000		Co-operative	40 000	30 000
A	**Total**	**125 000**	**125 000**	E	**Total**	**40 000**	**35 000**
	Medium-term assets				Medium-term liabilities		
	Tractors	50 000	60 000		Loan for bakkie	35 000	30 000
	Vehicles	40 000	60 000				
B	**Total**	**90 000**	**120 000**	F	**Total**	**35 000**	**30 000**
	Long-term assets				**Long-term liabilities**		
	Land	1 000 000	1 000 000		Loan for land	550 000	525 000
	Buildings	500 000	520 000				
C	**Total**	**1 500 000**	**1 520 000**	G	**Total**	**550 000**	**525 000**
				H	**Total liabilities E + F + G**	**625 000**	**590 000**
				J	**Owner's equity H + J or D - H**	**1 090 000**	**1 175 000**
D	**Total assets A + B + C**	**1 715 000**	**1 7650 000**	K	**Total H + J**	**1 715 000**	**1 765 000**

12 Let's talk about crop rotation

> *A well-planned crop rotation improves soil health considerably since there is increased organic matter, improved soil structure and a reduction in soil degradation.*

the use of synthetic fertilisers leads to reduced greenhouse gas emissions.

- Improved soil health combined with improved water retention = higher yields in the long term.
- Crop rotation is one of the easiest ways of maintaining soil productivity.

Do your homework and know your plants

Crop rotation is not something one decides upon suddenly. It is a carefully planned course of action. It is quite normal for a programme to be decided upon a number of years in advance. It is always a good idea to consult with local Grain SA development managers and other experts about the programme which would best suit your farming operations.

It is important to consider factors like:

- Is it a deep or shallow rooted crop e.g. maize and sunflowers are deep rooted plants while wheat and beans are shallow rooted.
- Is it a broad leafed or narrow leafed plant?

Signs of weed resistance due to overuse of the same chemicals.

- What herbicides will be applied, and do they have a long residual period which might cause damage to the follow-up crop in a rotation system?
- Ask other farmers which rotations have worked for them. In the North West the farmers like to follow a Year 1: Sunflower – Year 2: Legume e.g. beans or cow peas – Year 3: Maize rotation. The deep-rooted sunflower crop is followed by the shallow rooted legume crop which fixes nitrogen into the soil before the nutrient guzzling maize crop is planted.
- Crops of the same family should never be planted following each other simply because they are likely to share the same pests and diseases.

Article submitted by Jenny Mathews, Pula Imvula contributor. For more information, send an email to jenjonmat@gmail.com.

Is your business growing?

the year or it is in a better or stronger or safer position at the end of the year than in the beginning. This is not a profit or cash-flow, it is something else. You have invested more of your own funds and/or profits in your business and/or you have reduced the liabilities.

The balance sheet can also indicate whether your business is solvent or not. To determine this, one must calculate the ratio between assets and liabilities. In our example the ratio between the total assets and the total liabilities is 2.58:1. (R1 520 000 (C) divided by R590 000 (H) and expressed as a ratio). This then means for every R2,58 of assets you have liabilities of R1,00. The recommendation is that this ratio must be at least 2:1, which means

> *To be financially successful your business must make a profit.*

that your business is solvent and not so much at risk.

Vice versa if you have more liabilities than assets, for instance the ratio is 0.5:1, then your business is basically insolvent. This is only one example of several ratios one can calculate from the information presented in a balance sheet and each one tells a different story of the financial success of your business.

To be financially successful your business must make a profit (as determined from an income statement), the business must grow every year (determined from the balance sheet) and you must have cash available in your bank (cash-flow statement). However, to make a profit remains very important. If the business does not make a profit it will not grow, and you might not have money in the bank.

Article submitted by Marius Greyling, Pula Imvula contributor. For more information, send an email to mariusg@mcgacc.co.za.

LESSONS LEARNT from the 2016/2017 planting season

With the current high input costs associated with maize crops and the low margins, re-planting is actually a taboo topic. That is why it is essential for producers to be familiar with the challenges that occurred in the past and should try to avoid these mistakes.

Quite a number of these challenges are small problems that lead to great frustration and that could have been avoided in many cases.

Natural causes

Rumour has it that as much as 55 000 ha (2016/2017) had to be re-planted as a result of wind simply killing seedlings because there was not enough stubble in the fields (**Photo 1**). The lack of stubble is the result of the previous dry season.

Good years sometimes also have negative effects, and in **Photo 2** you can see where plants grow extremely abundantly and are then subjected to strong winds or whirlwinds, which then leads to green snap.

Plants grow relatively quickly and then the stems become like glass and cannot bend or yield in strong wind. They then break as if the stem has been cut with a knife. The effect of this phenomenon seldom has an impact on the potential of the crop. Usually, it involves between 5% and 10% of plants.

The effect of compaction and poor root development, accompanied by heavy rains and strong winds, also leads to lodging (**Photo 3**).

Chemicals

The other regular challenge is the placement of fertiliser. Placing fertiliser too close to the seed causes fertiliser burn (**Photo 4a** and **Photo 4b**) and consequently poor germination. The norm in this case is that fertiliser should be placed at least 5 cm away from and 5 cm below the seed.

It will be worthwhile to put the planter in the field just before planting and then dig to establish whether the fertiliser has been placed according to the norm.

Where pre-emergence herbicides were administered and followed by cold or cool conditions, the seedling can be dwarfed or deformed (**Photo 5a** and **Photo 5b**). This happens because the seedling does not appear above the soil surface within the optimum time of five to seven days, and is then exposed to the herbicide for too long.

The effect of transfer herbicide is underestimated every time. It is important to read the withdrawal periods for follow-up crops on the label and obey them to prevent disappointment (**Photo 6**).

1

Land affected by wind erosion in the north-west Free State during the 2016/2017 planting season.

2

Green snap on maize occurs sporadically and is not linked to a particular cultivar.

3

The effect of compaction and poor root development, accompanied by heavy rains and strong winds, led to lodging.

Lessons learnt from the 2016/2017 planting season

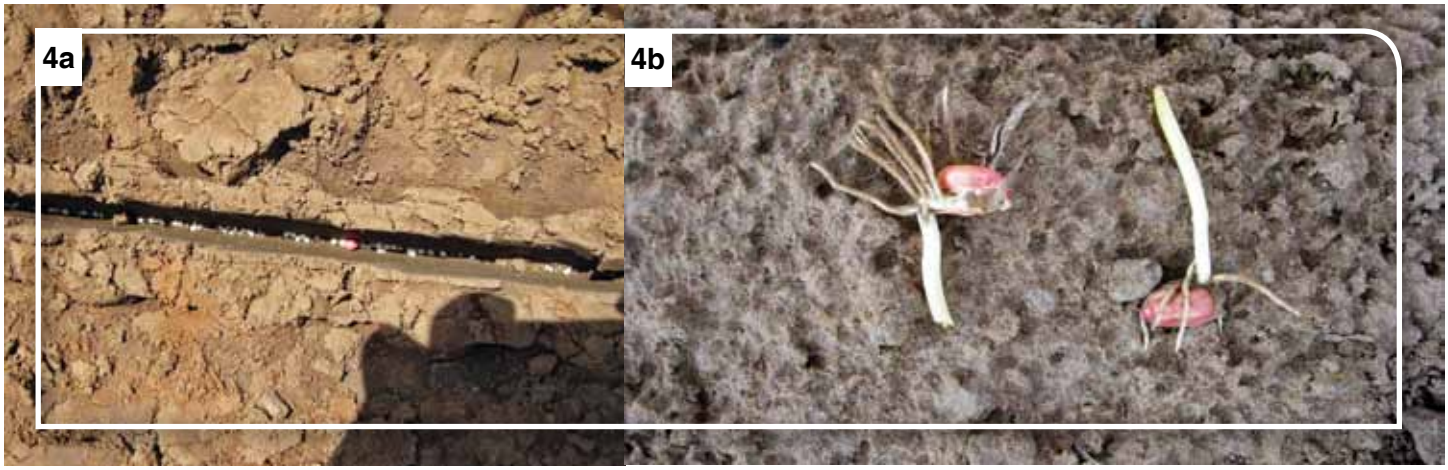


Photo 4a: Fertiliser burn of the seedling where fertiliser was placed too close to seed.
Photo 4b: Fertiliser burn typically shows that the primary roots are dead and the plant forms a new root to survive.

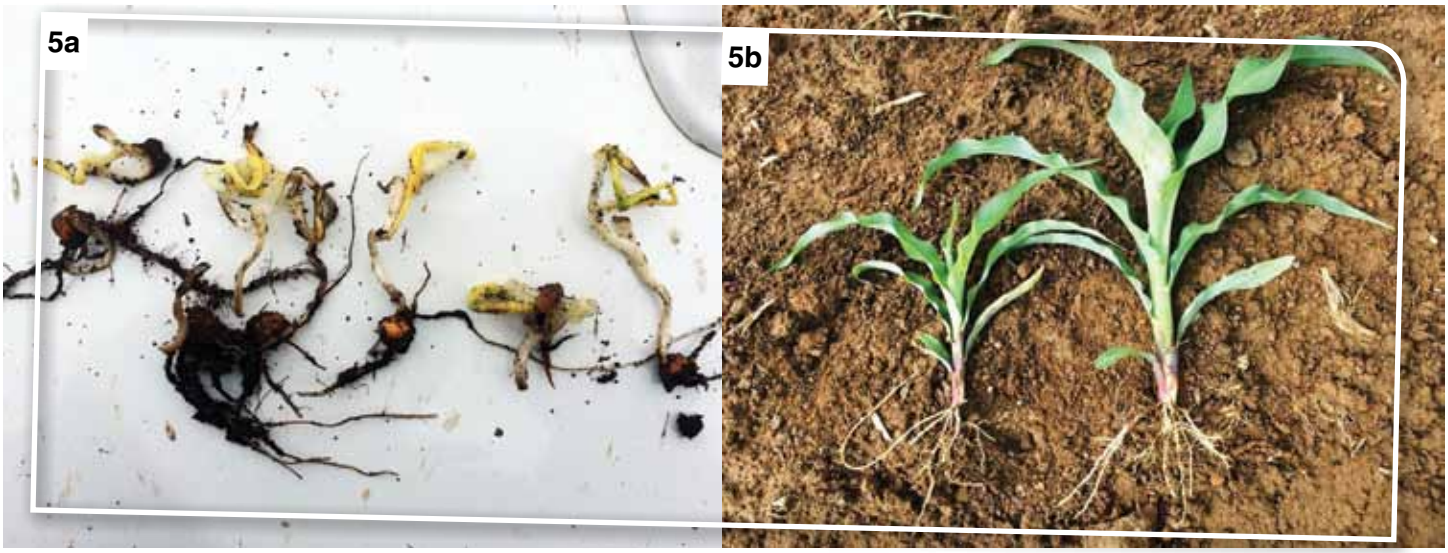


Photo 5a: Deformed seedlings as a result of cool/cold conditions and pre-emergence herbicide.
Photo 5b: Typical healthy seedlings like these then seldom appear above the soil surface.

In cases where fungicides are sprayed, it is extremely important to consult the label to determine whether wetting agents should be added to the fungicide. Most of the products already contain wetting agents, and if additional wetting agents are added, ear development can be arrested (AED).

Spraying for fungal infections should not take place between the V12 and V16 growth stages (**Photo 7a** and **Photo 7b**). At these stages ear development is extremely active and such sprayings can be the cause of arrested ear development.

It remains important to know where conventional and RR hybrids have been planted, otherwise major damage can occur (**Photo 8**).

Sprays should be cleaned thoroughly after use, otherwise some of the previous herbicide

The withdrawal time is ten months from administration up to and including the planting of maize.

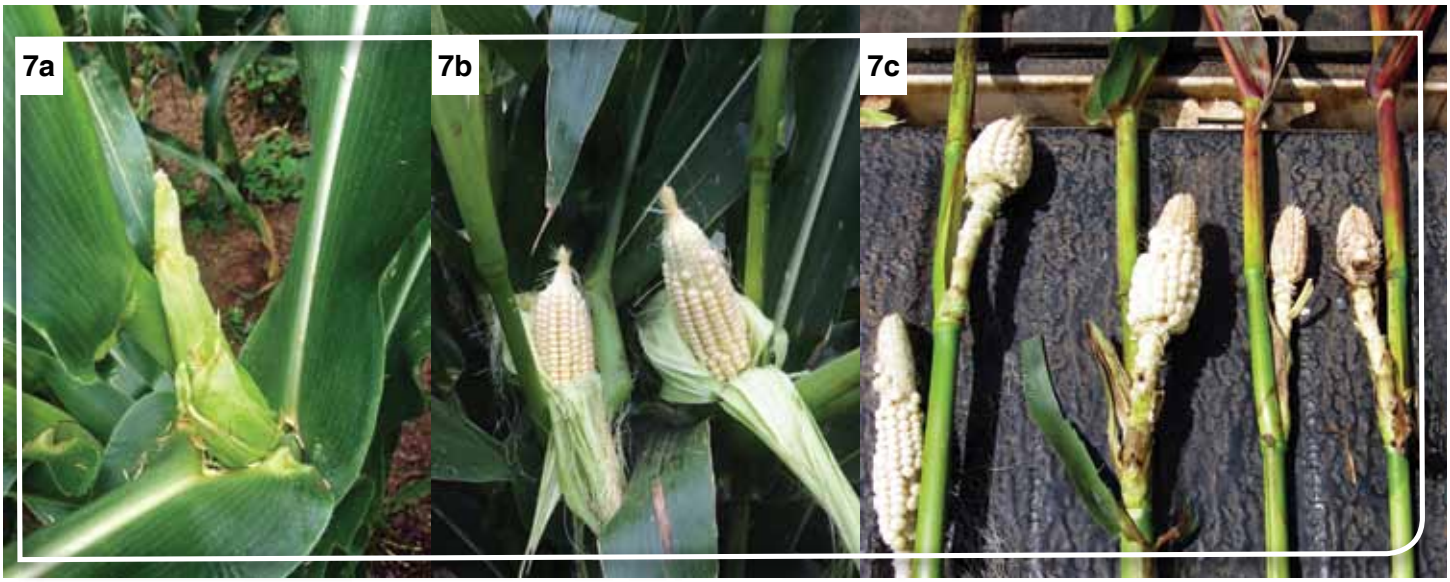


Photo 7a and 7b: Impaired ear development in maize due to agrochemical spraying at a sensitive stage (V12 - V16).
Photo 7c: An example of deformed ears where chemicals have been sprayed after growth stage 7 (V7).

It remains important to know where conventional and RR hybrids have been planted.

An example of a sprayer that was not cleaned of previous herbicides (that were still in the tank) and that then harm the next crop.

Sometimes you are at your wits' end about the dwarfed plants in the row – in this case it was filaria damage on germs.

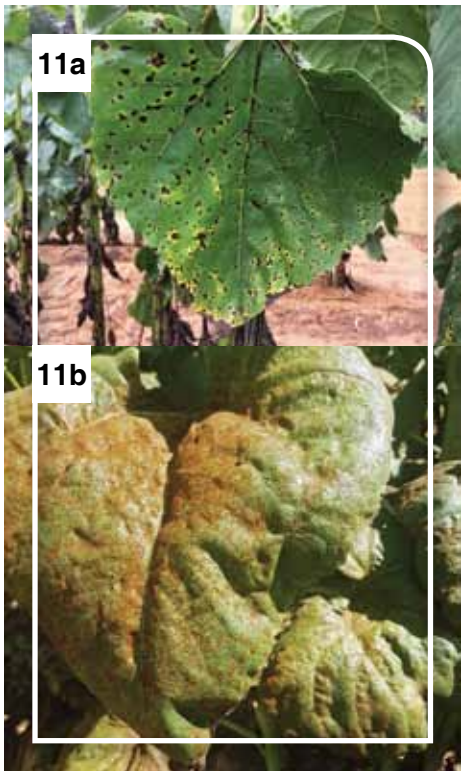


*Photo 11a and 11b: Alternaria (***Alternaria alternate***) and common rust (***Puccinia helianthi***) on sunflowers.*

Undesirable weeds in fields, stealing moisture as well as nutrients.

Here the effectiveness of good weed control can be clearly seen.

that is still in the tank can harm the next crop (**Photo 9**).

Insects also contribute to the frustration. Sometimes you are at your wits' end about the dwarfed plants in the row – in this case it was filaria damage on germ (**Photo 10**).

Relatively warm and humid conditions promote fungal disease (**Photo 11a** and **Photo 11b**).

Effective weed control is critical (**Photo 12** and **Photo 13**).

Pay attention to the small problems and make sure your crop is not harmed!

Article submitted by Sakkie Koster, agronomist, Pioneer HiBred, for SA Graan/Grain October 2017. For more information, send an email to sakkie.koster@pioneer.com.

SALT-AFFECTED SOILS and WATERLOGGING on irrigation schemes

At the very first South African Irrigation Congress held in 1909, much concern was expressed at the extent of salt-affected soils and the sediment content of water supplies (Kanthach, 1909).

At the National Irrigation Symposium 82 years later, Scotney and Van der Merwe (1991) had the same concerns and said that the long-term viability of soil and water resources is in jeopardy. Major threats to these resources result from, among others, salinity, sodicity and waterlogging.

A review of about 3 000 soil irrigation reports at the ARC-Institute for Soil, Climate and Water, revealed that soils free of limitations for sustainable irrigation are limited in extent in South Africa. However, it appears that waterlogging, salinity and sodicity affects only 10% to 18% of the area under regular irrigation in South Africa.

This is much lower than experienced in many countries, because of the strict emphasis placed on the potential for waterlogging, salinity and sodicity and its prevention in the selection criteria for irrigated soils in South Africa in the past. Another advantage is the generally good water quality that has historically been available for irrigation in South Africa.

Currently the salinity and sodicity of South African waters are on the increase due to mining, urban, industrial and agricultural developments and the re-use of water resources. Irrigated agriculture is not only at the receiving end of water quality deterioration, but also a contributor to water quality deterioration experienced in many rivers. The use of this water poses a future threat for soils on South African irrigation schemes where leaching is limited.

It is evident from information available that the degree of degradation varies considerably between irrigation schemes and also over time within the same irrigation scheme in South Africa. An increase in salinity and sodicity normally coincide with hydrologically dry years with below-average runoff and an increase in waterlogging during hydrologically wet years.

Satellite images to quantify and identify salt-affected soils and waterlogging

National monitoring of waterlogging and salt accumulation are a high priority, but currently no verified methodology is available to undertake this task. A recently completed Water Research Commission project by researchers from the ARC-Institute for Soil, Climate and Water and Stellenbosch University sought to determine the potential of various data sources and techniques for monitoring waterlogging and salt accumulation and to quantify the current level of waterlogging and salt accumulation and

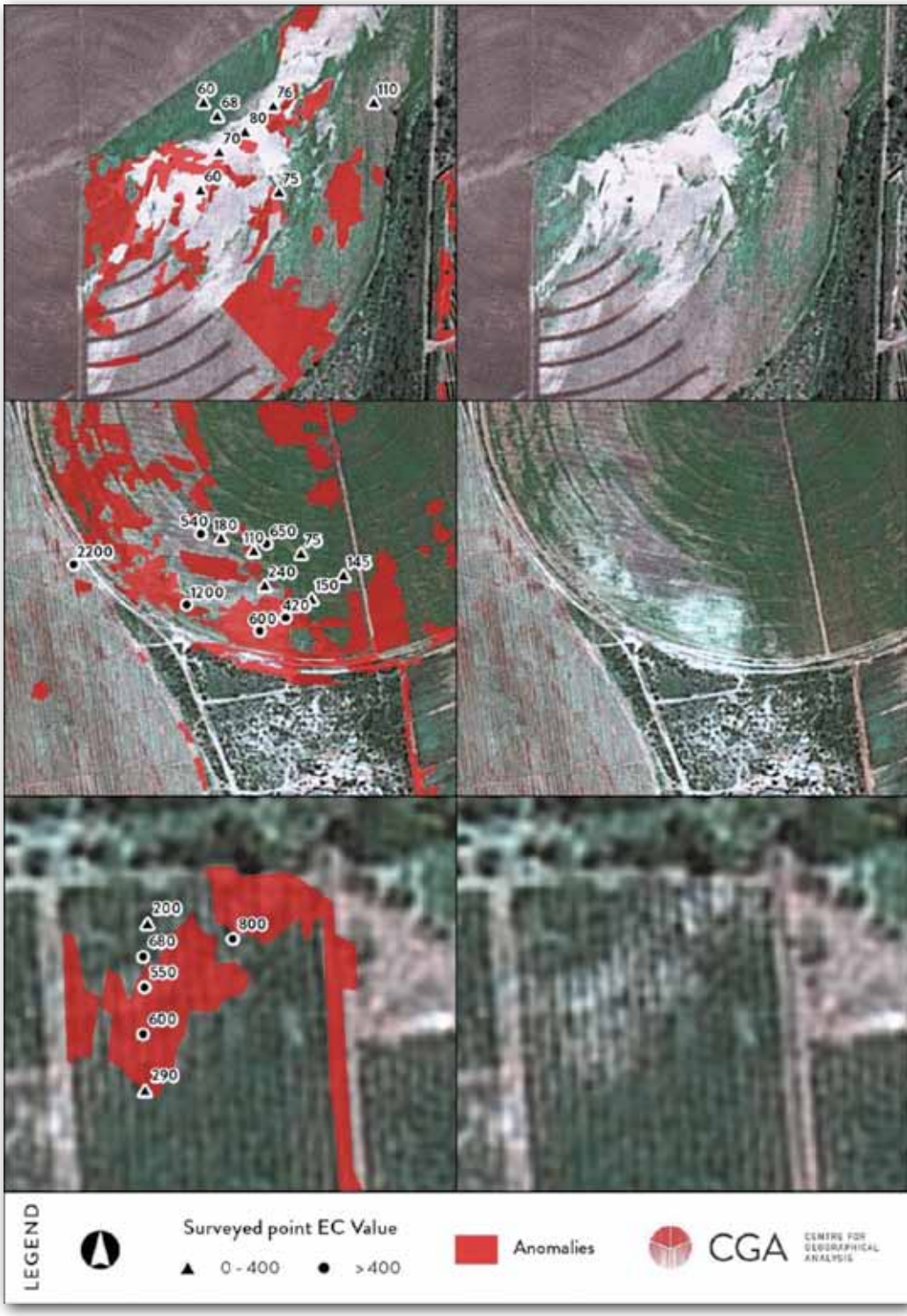


Figure 1: Examples of large anomalies detected at Olifants River Irrigation Scheme (Vredendal) that were confirmed to be related to waterlogging.

Table 1: Summary of the areas affected by salt accumulation and waterlogging.

Study area			Affected		Adjusted	
Name	**ha**	**ha***	**ha**	**%**	**ha**	**%**
Vaalharts	26 434	27 033	414,7	1,57	848,9	3,14
Loskop	38 831	40 867	887,1	2,28	2 344,7	5,74
Makhathini	**4 312**	**4 624**	**138,5**	**3,21**	**361,1**	**7,81**
Olifants River	**11 284**	**11 911**	224,6	1,99	664,9	5,58
Tugela River	27 384	28 244	1 477,3	5,39	2 102,8	7,44
Breede River	**29 129**	**30 188**	**1 396,8**	**4,80**	**2 215,3**	**7,34**
Sundays River	18 608	18 832	528,2	2,84	740,5	3,93
Limpopo River	**8 681**	**8 805**	**468,1**	**5,39**	**564,0**	**6,40**
Douglas	22 748	23 445	1 483,3	6,52	2 124,0	9,06
MEAN	20 823	21 550	779,8	3,78	1 329,6	6,27

monitor changes over time at the appropriate scale on irrigation schemes in South Africa (Nell *et al.*, 2015).

Remote sensing is the practice of deriving information about the earth's land and water surfaces using images acquired from an overhead perspective, by employing electromagnetic radiation in one or more regions of the electromagnetic spectrum, reflected or emitted from the earth's surface.

The challenge with using remote sensing for identifying and delineating waterlogged and salt-affected areas is that they are local manifestations and can only be differentiated

> *Currently the salinity and sodicity of South African waters are on the increase due to mining, urban, industrial and agricultural developments and the re-use of water resources.*

from unaffected areas by taking its context (surrounding area) into consideration. For instance, an affected area within a wheat field will have very different spectral properties to an affected area in a vineyard, while the latter will have a very different spectral response compared to an affected area within a bare/fallow field.

The occurrence of salt accumulation and waterlogging in generally small patches in South African irrigation schemes poses additional challenges.

Three approaches to mapping waterlogged and salt-affected areas were identified as potential solutions. The first is a modelling approach whereby hydrological, terrain and soil

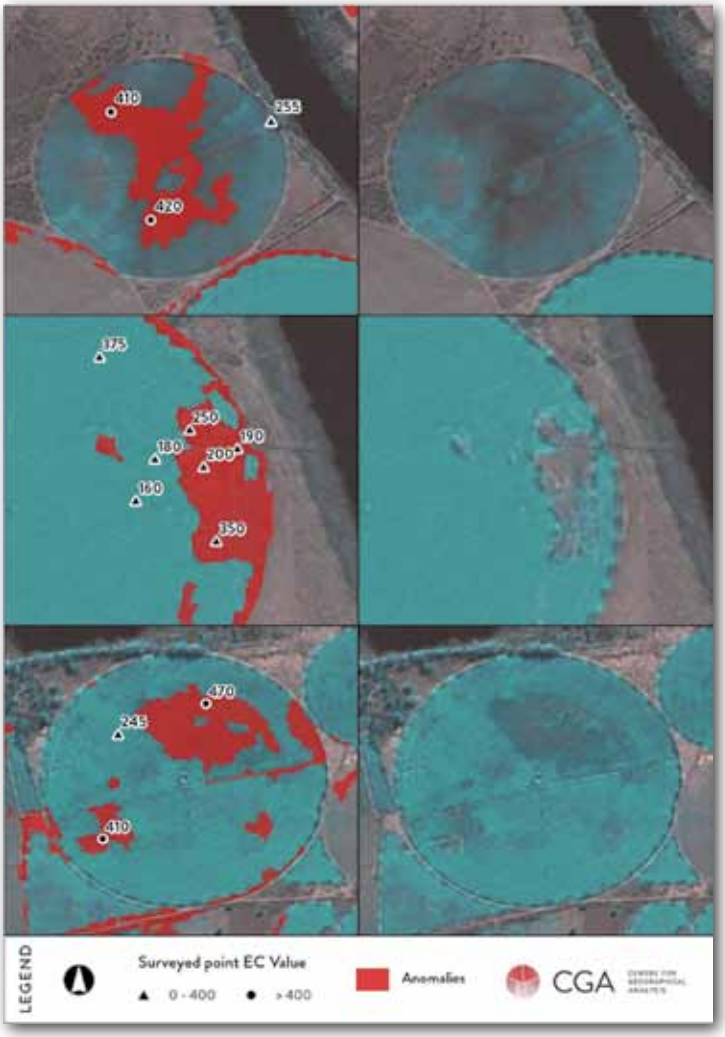


Figure 2: Examples of large anomalies detected at Pont Drift that were confirmed to be related to flooding, waterlogging and/or salt accumulation.

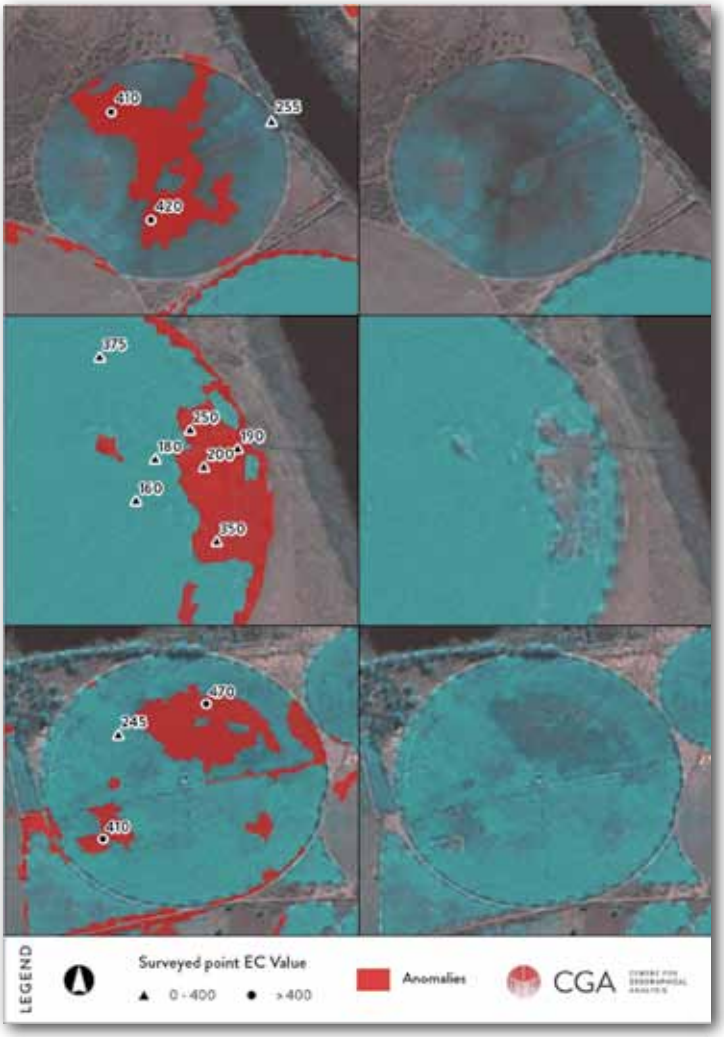


Figure 3: Examples of large anomalies detected at Douglas that were confirmed to be related to salt accumulation or waterlogging.

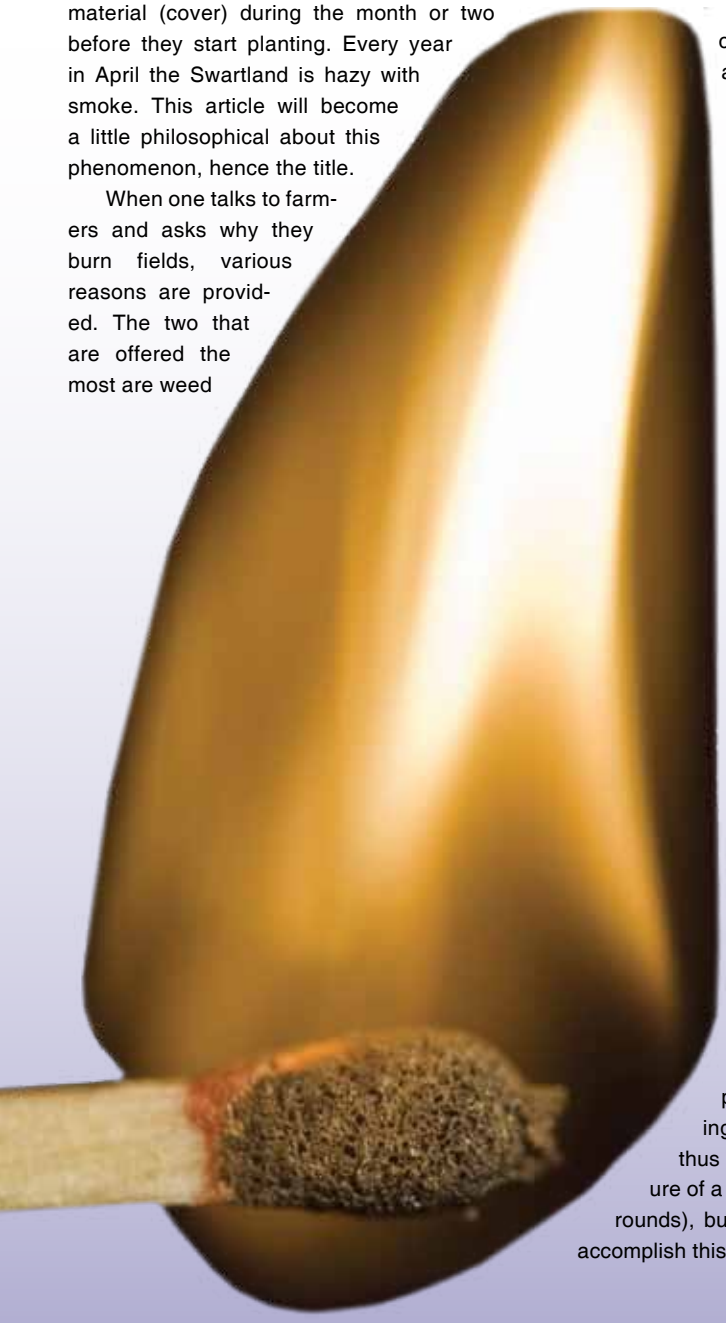
THE COST OF A MATCH

Conservation agriculture is based on three pillars, namely minimum soil disturbance, diversity through crop rotation, and the retention of cover. The success of conservation agriculture depends on a holistic systems approach.

Implementing only or two of the pillars can work, but it is important to realise that there is a greater chance of success when the full system is implemented.

Most of the farmers in the wheat producing areas of the Western Cape have already embraced the concepts of conservation agriculture and apply them in an excellent manner. However, there are still those who burn their material (cover) during the month or two before they start planting. Every year in April the Swartland is hazy with smoke. This article will become a little philosophical about this phenomenon, hence the title.

When one talks to farmers and asks why they burn fields, various reasons are provided. The two that are offered the most are weed control, and so that they can plant more easily with their tine planters.



These are definitely two aspects that can cause problems in a production system. When you burn crop residue to control the seed of weeds, you have to follow a set of prescriptions in order to succeed. The Australian Herbicide Resistance Initiative (AHRI) has conducted considerable research in this regard.

To be truly successful, the material should be placed in narrow wind rows, there should be a high volume of material in that wind row, and the burning process should be slow and against the wind. In most cases, or perhaps in all cases, where anyone is burning locally, this does not happen.

The benefits of retaining crop residue on the soil surface are well known. They keep the soil cool in summer and warm in winter, combat wind and water erosion and provide a source of nutrition to the organisms in the soil that process the organic matter, so that we can build up organic matter (therefore carbon) slowly but surely over time.

Water infiltration is also better where there is material on the soil.

What happens when it is burnt?

You lose your organic cover, you increase your risk, you increase your costs and you slowly become increasingly poorer.

We will focus on the following three aspects: carbon dioxide (CO_2) release, water retention capacity and loss of nutrients.

CO_2 release

Everyone is aware of the role of CO_2 in climate change. Through long years of ploughing agriculture has played a major role in the release of CO_2 in the atmosphere. Not only did the ploughing of the soil release CO_2 and thus burn stored soil carbon (a figure of a loss of about 80% is doing the rounds), but we also used fossil fuels to accomplish this.

This is very true in the case of the Swartland, where most of the soil has less than 0,5% carbon left. With the conversion from conventional tillage to minimal soil disturbance over the past 20 or 30 years (first minimum tillage or conservation tillage, and later no-till) we were able to at least allow the burning of fossil fuels to decline.

However, when we burn crop residue, we once more contribute to the release of large quantities of CO_2 into the atmosphere. After an interesting conversation with a soil scientist, I was shocked when we calculated the loss.

Let us take wheat straw as an example. Carbon constitutes 40% of the total weight of wheat straw. When stubble is burnt, the carbon reacts with oxygen to form CO_2. Two oxygen molecules bind to each carbon molecule, and the result is that a heavier compound is formed.

> *"Climate change is knocking on our door, and we have to do everything we possibly can to limit its influence in our province.*

In short, if you take the molecular weights of the elements into account, the sum looks as follows: If 100% burning occurs, 1 kg of wheat straw contains 400 g of carbon. This is 33,33 mol carbon, which is equal to 33,33 mol CO_2, and the mass of 33,33 mol CO_2 is 1,47 kg. This figure will naturally also vary according to the type of crop, but it is nevertheless disturbingly high.

Water retention capacity

The value of organic matter in the soil is well known. One of the greatest values of the organic matter is its ability to retain water.

The American Department of Agriculture has relatively illuminating information on the topic, and they compare the value of 1% of organic matter in the top 15 cm of the soil profile to 27 000 gallons of water per acre, or 252 556 litres per hectare.

Under the circumstances in which dryland grain production occurs, this is extremely valuable. The value is clearly visible in the long-term crop rotation trials on the Langgewens Research Farm (Western Cape Department of Agriculture) in the Swartland.

As the lower end of the trial is a smallish farm dam that filled and even overflowed every winter, but now there are seldom more than a few centimetres of water in the dam. The soil retains the moisture and the run off of rainwater is reduced.

Loss of nutrients

The inclusion of a legume or grazing within a crop rotation strategy can play an important role in reducing the nitrogen requirements of consecutive crops. There is a multitude of nutrients tied up in the residue remaining.

I recently laid my hands on a spreadsheet app from the pen of an Australian agronomist and carbon expert. This gives you an idea of how much nitrogen, phosphate an potassium is lost if residue is burnt.

There are roughly 1,5 times more residue than the quantity of seed harvested. If you then use the app and apply it to a wheat crop of 3 tons, there is therefore 4,5 tons of residue per ha.

According to the app a farmer loses 27,5 kg/ha of nitrogen, 1,6 kg/ha of phosphate and 26,2 kg/ha of potassium. When you take the costs per kilogram of only these three nutrients into account, it totals a sizeable amount.

These losses have to be replaced with purchased fertiliser, which increases the costs of production. And we are not even looking at the rest of the macro and micro-elements.

Conclusion

Climate change is knocking on our door, and we have to do everything we possibly can to limit its influence in our province. Conservation agriculture is therefore one of the strategies that has been included in the SMARTAgri plan for the Western Cape to reduce risk.

If we are honest with each other, it makes basic economic sense not to light a match. Now, before I am crucified, we should also tell each other that the values above are quite probably a worst case scenario and can vary from one area to the next, but we are and remain the stewards of the land on which we farm.

Think deeply and make the sums before you light the next match – even if it is only to light your cigarette.

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19 Salt-affected soils and waterlogging on irrigation schemes

data is used to determine where waterlogging or salt accumulation is likely to occur.

Another approach is to differentiate affected and unaffected soils by making use of remotely-sensed imagery (hyperspectral or multispectral) to analyse their spectral properties. This direct remote sensing method is consequently applied to exposed (bare) soil.

The third approach, referred to as the indirect remote sensing approach, examines vegetation response (e.g. loss of biomass) to saline or waterlogged conditions.

It became clear that image texture (heterogeneity) is an important feature for identifying areas that are likely to be salt-affected or waterlogged. The newly-developed within-field anomaly detection (WFAD) method) is based on the principle that heterogeneous areas are in many cases indicative of waterlogging or salt accumulation.

> *"Remote sensing is the practice of deriving information about the earth's land and water surfaces using images acquired from an overhead perspective, by employing electromagnetic radiation in one or more regions of the electromagnetic spectrum, reflected or emitted from the earth's surface.*

Affected areas often stand out as being spectrally different compared to the rest of a field, either because of a reduction in biomass due to saline or saturated conditions (in cultivated fields) or due to specific species of vegetation occurring in fallow fields. Although such 'anomalies' can be easily identified using visual interpretation of imagery, they are not easily extracted from remotely-sensed data.

Traditional remote sensing techniques involve classifying individual pixels (cells) without taking topology (relationships between spatial entities) into consideration. The results showed that, compared to the other methods evaluated, within-field anomaly detection produced the most promising results for monitoring and quantification purposes.

The technique not only produced accurate results, but is also cost-effective as it can be applied on both vegetated and non-vegetated fields, requires no empirical data, makes use of freely available imagery (SPOT-5 and 6); and has the potential to be fully automated.

Quantification of salinity, sodicity and waterlogging in South Africa

From previous studies it appears that severe waterlogging, salinity and sodicity affects 8% to 18% of the area under regular irrigation in South Africa (Backeberg *et al.*, 1996). Ghassemi *et al.* (1995) stated that a survey of five major irrigation schemes in South Africa indicated that, on average, 28% of irrigated land shows signs of either waterlogging or harmful high salt contents or both.

Salt-affected and waterlogged figures of 18% to 28% for South Africa seem unrealistic if compared to the current study of 6,27% (**Table 1**). If the figure of 6,27% of areas affected is applied to the 1,5 million hectares under irrigation in South Africa, the area that is salt-affected and waterlogged on South African irrigation schemes is 94 050 ha.

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Successful hybrid selection

One of the most important decisions that farmers make every year is the selection of a package of hybrids to plant.

When selecting a suitable hybrid package, yield performance and hedging of risk are important considerations. This is complemented by the hybrids' agronomic characteristics and disease tolerance attributes.

The following characteristics should be considered in choosing the right hybrids:

- **Yield performance, stability and compensation ability.**
- **Hybrid package.**
- **Growing season length.**
- **Prolificacy – multi-eared or a single-eared.**
- **Standability.**
- **Germination and vigour.**
- **Disease, insect tolerance and weed control;**
  - **Transgenic traits for insect or herbicide tolerance; and**
  - **Herbicide tolerance.**

Remember the yield and adaptability of a hybrid is the result of the interaction between a hybrid's genetics, the environmental factors and management practices that are applied.

> *When selecting a suitable hybrid package, yield performance and hedging of risk are important considerations.*

PAN 5A-291 is a very prolific hybrid well adapted to low plant population and varying climatic conditions e.g. dry western production regions.

Single eared hybrids like PAN 3R-700BR are well adapted to high yield potential production e.g. irrigation.

In summary, some basic guidelines:

- Select hybrids that are proven performers based on multi-season data from multiple trials across a large homogeneous area. It is about yield performance, stability and adaptability.
- New hybrids should be phased in gradually.
- Select a package of hybrids with a variety of maturity or growth classes to spread the risk.
- Include early growing season hybrids in your package if early harvesting is important.
- Consider Bt-hybrids if plantings are going to be late in the season.
- Prolific hybrids should be considered in the dryland areas with a variable or challenging climate and will generally deliver stable yields.
- Single eared hybrids are better adapted to high plant populations and higher potential conditions.

Article submitted by Christin Hunter, Marketing Communications Manager, Pannar. For more information, send an email to christin.hunter@pannar.co.za.

Pula Imvula's Quote of the Month

Leadership is practiced not so much in words as in attitude and in actions.

~ Harold S. Geneen

The Corner Post

CAREL FOORD
Building self-esteem through accomplishments

The Indian activist, Mahatma Gandhi, touched many lives with his philosophical thoughts, like 'Find yourself in the service of others'.

In this series of The Corner Post we feature the mentors and provincial co-ordinators who find themselves in the service of Grain SA and emerging farmers throughout South Africa. These dedicated mentors all form part of the Grain SA mentorship programme, giving advice on how to achieve your own goals and dreams.

From miner to mentor

Carel Foord was raised on his grandfather's farm and gained most of his agricultural knowledge from this life mentor. After completing his school career, he reported for his military training and was then employed on the mine where he successfully completed a trade. Whilst following a successful career on the mines, he managed to purchase a small piece of land where he began his own farming enterprise – a small dairy with two cows and two calves. He later added some sheep and slowly expanded his farming operation. When the mine closed in 2006, he started his full-time farming career.

Having an entrepreneurial mindset, he also decided to buy more land. 'I always tried to buy farms with potential – land that no one else wanted,' he says. Renovations were done to the buildings and fences were fixed to lure potential buyers. In this way he made money and was able to expand the dairy.

In 2012 the government purchased the farm and dairy which at that stage was delivering 6 000 litres of milk per day. The precondition of the transaction was that all employees remained part of the dairy and that Carel would be their mentor for as long as necessary to keep the dairy functioning to its full capacity. This success story was also published in several newspapers.

Although he has now retired, Carel is still part of a consortium of farmers running a farming enterprise in the Cape Province. About two years ago he was approached by Jurie Mentz, Grain SA's Development Co-ordinator. He was asked to become part of the Grain SA mentorship programme because of his experience in mentorship. 'Although I may have been a milk farmer primarily, I had to plant to provide grazing for the winter months,' he says about his knowledge in this area.

Changing minds to change methods

Carel realises that changing the methods of older farmers is more of a challenge as they cling to the established way – the way things have always been done. About 90% of the farmers in the Vryheid district who form part of Carel's groups are over 50 years of age, with the eldest born in 1924. 'Although old Maduma can show me a thing or two when it comes to manual labour, I know my methods will make him a better farmer – even at 94 years of age,' he says about the oldest member of his study groups.

Practical results are the way that new methods and practises will be accepted here. 'Things like knowing and feeding your soil and the importance of fertiliser is foreign to most of these farmers. The younger farmers are beginning to understand why it is important to spend money to make money and are slowly coming around to an advanced way of doing things.'

Ophuzane in Paul Pietersburg and the seven Vryheid groups meet weekly. Instead of having everyone congregate at the local communal hall for the lecture and to get their inputs, Carel decided to divide them into smaller groups. The groups now meet at locations closer to their homes and he also gives advice during practical sessions at their various locations.

Overcoming obstacles to succeed

When people are determined they can overcome anything. These words were spoken by our beloved former president, Nelson Mandela. This is also the reality Carel has witnessed amongst the 164 farmers in the Vryheid district whom he has been mentoring.

Ranging in age from early 20's up to 94, his group of determined producers have many stumbling blocks to overcome to put food on the table. They are however determined to make a success of their farming operations and to improve their yield.

One of the biggest stumbling blocks with which these farmers are confronted is combating pests and plagues. Crows destroy their crops while mice eat any maize in storage. Carel buys poison when it becomes overwhelming and spends a lot of time giving advice about these problems.

Another shortcoming identified amongst the farmers in this district is in mechanisation. A shortage of tractors and implements makes it very difficult to implement more modern farming practices. 'Most of the farmers still use donkeys and plant by hand and although it is wonderful to see the donkeys at work, implements are needed to lighten the work load and achieve better results,' he adds. Some of the local commercial producers have also become involved through Carel. 'They have really stepped up and are helping with the planting, giving guidance and sorting out problems as they arise,' he shares about a way in which bridges are being built in this area.

With so many of the farmers showing vast improvement over the past two years, he does not want to highlight only one farmer's story. 'Any farmer who puts food on the table is a success story.' One of the things he truly appreciates about his farmers is that they are arriving on time for meetings. This way they can get the most out of the allocated time.

Carel says no one can be involved in the mentorship programme without it having an impact on your own life. In the district he is known as 'Mashesha', which means hurry up. 'The mentorship programme has stripped me from impatience and perhaps my name should be tortoise now!' he chuckles. He is also touched when he visits the farmers at home and they proudly show off their flourishing vegetable patches. 'The mentorship programme not only teaches, it restores dignity,' he says.

This month's edition of The Corner Post was written by Louise Kunz, Pula Imvula contributor. For more information, send an email to louise@infoworks.biz.

From emergence to a successful harvest

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The PAN 5R-791BR platform performed very well throughout the ARC national trials for the western and eastern production regions. The PAN 4A-111 platform's popularity in the eastern regions is underwritten by its excellent performance in the ARC national trials.

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